Our Future: Sustainability and our community.

Focus series of Mini Units based on our future.

Time: 4 x 2 week units

Term 4

School Inquiry Statement
Students will become confident and skillful at setting and answering questions of interest to them, learning to think critically when locating, analyzing and applying information.

Learning Intentions

1: Our Environment: Pollution Solution

What value do we place on water?

Identify and assess environmental issues in our community.
Create a wiki on environmental issues to inform.
Use graphic organizers such as T Chart PMI and Decision charts to analyze problems.

Explain and defend an environmental decision and then debate.

2: Life after fossil fuels.
Identify and assess sustainability issues around fossil fuels. (Remember and Evaluate)
Use STRIVE models to research alternative solutions and complete graphic organizers to select the best option.

3: Our class in the future.
Design a class of the future.(Create)

4: Future leisure time activities.
Invent a game that people would play in the future.(Create)

1: Te Wai: What value do we place on water?

Learning Activities
1. Ask students to name some water ecosystems. (They might mention oceans, rivers, ponds, lakes, marshlands.)

Walk to Lake Horowhenua to assess environmental issues.

2. Now ask them to mention any factors they know of that contribute to the pollution and destruction of water ecosystems. List their suggestions .

3. Divide your class into groups, and have each group research one of the factors you have listed. Groups should focus their research on how their factor affects water ecosystems, particularly those in your area, if applicable, and the methods that are being employed to counter it.

4. When their research is complete, each group should choose one water ecosystem that has been affected by the factor they have been assigned and prepare an environmental-impact statement about it. Each statement should include four elements:

- a description of the current environmental status of the ecosystem
- a description of the way or ways in which the factor affects the ecosystem
- a description of the existing methods that are being used to combat the factor
- suggestions for future methods of combating the factor

5. When the statements are complete, invite groups to share their findings with the class.

Extension:
Adaptations for Older Students:
Have students include a scientific explanation for how and why the factor they have been assigned contributes to the pollution and destruction of the ecosystem on which their statements focus.

Insert water useage meter from Melbourne Territorial Authority and discuss water useage.

EVALUATION:

You can evaluate your students on their assignments using the following three-point rubric:

- **Three points:**complete description of the current status of the ecosystem, accurate description of the way or ways in which the factor affects the ecosystem, clear description of methods being used to combat the factor, reasonable suggestions for future methods

- **Two points:**adequate description of the current status of the ecosystem, acceptable description of the way or ways in which the factor affects the ecosystem, vague description of methods being used to combat the factor, unrealistic suggestions for future methods

2: Fossil Fuels Unit
Research Evolution of transport.

Visit Southward car museum

1. Ask students to discuss what they already know about fuel efficiency in cars. Pose the following questions:

- Which types of cars are the most fuel efficient and why?
- What factors might contribute to a desire for increased fuel efficiency in cars?

- How fuel-efficient are cars today compared to 50 years ago?

2. Divide the class into small groups of approximately four students each. Read the following scenario to the class:Pretend that you live in the year 3000. Your group is a team of archaeologists who have been studying the very interesting time period of A.D. 2000-2050. You've just excavated a site that reveals a great deal about transportation during this time period. At this site, you've found dozens of old cars and car pieces. You've also found an old sign that says “Joe's Junkyard, Established 2015.” Therefore, you assume the oldest cars in this junkyard are from about the year 2000. You know that in 2050, a catastrophic earthquake leveled this part of town and all businesses ceased to operate. You can assume that cars in this junkyard are models from about 2000 to 2050. Your assignment is to present a report to the country's leading archaeologists explaining the following things:

- The ways in which attitudes toward fossil fuel use and the use of alternative energy sources changed between 2000 and 2050, and the reasons for these changes.
- Changes to automobile technology and power sources between 2000 (the year when the oldest cars junked in 2015 would probably have been built) and 2050, and the ways in which these changes reflected changing attitudes toward fossil fuel use and alternative energy sources.

3. When students take themselves out of this futuristic scenario and into the present time, they will therefore need to make predictions about the following things:

- How and why (or whether) attitudes toward fossil fuel use will change over the next 50 years.
- The reasons why we might see changes in the way cars are powered.
- The changes that will occur in car technology in order to accommodate changing attitudes toward fuel efficiency and energy sources.

4. Ask groups to use the Internet, the library, and any other relevant resources they can find to answer the following questions: **STRIVE**

- How do present-day internal-combustion car engines work? How is fuel processed in the engine in order to make the car operate?
- What can be done to increase a car's fuel efficiency?
- What types of alternative energy sources are being developed for future cars? How do these energy sources power the car? What are the advantages and disadvantages of each type of energy source? Which energy sources seem most likely to be commonly used in cars of the future?
- What environmental, political, and cultural factors might contribute to a desire for cars with higher fuel efficiency or cars that use alternative energy sources?
- What factors might detract from creating cars with higher fuel efficiency or cars that use alternative energy sources?

The following Web sites will be helpful in students' research:
Energy Quest

Fuel Economy Site
Alternative Fuels Data Center

5. Once they've finished their research, have groups prepare their reports. The reports should have two components:

- Oral presentation: Have groups make oral presentations to a panel of archaeologists (i.e., the rest of the class) describing the things that their team has found in Joe's Junkyard and the conclusions it has reached concerning changes in automobile energy sources and attitudes toward energy use from 2000 to 2050. Their presentations should address the questions they investigated in step 4 of this lesson and should include visual aids when appropriate. For example, they can include diagrams of car engines that use different energy sources (traditional versus hybrid, for example) or charts showing the projected supply of fossil fuels or smog reduction goals for a particular city.
- Written paper: Have each student individually write a two- to three-page paper describing the conclusions his or her group has drawn from Joe's Junkyard and summarizing the group's predictions for the ways in which energy sources and attitudes toward energy sources will change over the next 50 years (2000-2050). Note: It's entirely possible that students will conclude that the public is not likely to change its attitudes toward fossil fuel use, that car companies will not follow through with plans to create cars powered by alternative energy sources, and that things won't be all that different 50 years from now. It's fine for them to draw this conclusion, but they must support their argument with detailed evidence from their research. They can claim that the cars in Joe's Junkyard didn't change much during this 50-year period (or that they became less fuel efficient), but they must justify their reasoning by showing evidence from current trends and predictions they've found in their research.

DISCUSSION QUESTIONS:

1. Hypothesize the design features that could increase a car's fuel efficiency. Discuss how aspects of the engine, body, and other components of the car could be modified to minimize the amount of fuel the car requires.

2. Explain why you think there are many more sport utility vehicles on the road today than there were 10 years ago. Compare the design features of a sport utility vehicle with those of a car in terms of their fuel efficiency.

3. Describe the reasons why car manufacturers dramatically increased their cars' fuel efficiency over the past 50 years.

3: Our class in the future.
Design a class of the future.(Create)

Draw what their future class would look like and present to the class.

4: Future leisure time activities.
Invent a game that people would play in the future.(Create)

Develop Instructions and rules for an invented game.